

CLAIMS

1. A surgical hollow probe for minimally invasive tissue removal, comprising

an elongate hollow body,

an opening in the region of the distal end of the hollow body for receiving tissue, and

an electrically conductive ring-shaped or loop-shaped cutting element which can be extended from the hollow body and which can be applied to an HF-voltage source, for electrosurgically cutting out tissue in the area around the distal opening of the hollow body,

characterised in that the cutting element (10) can be extended from or pivoted out of the hollow body (2) transversely with respect to the longitudinal axis (3) of the hollow body (2) and is then displaceable outside the hollow body (2) along the hollow body (2).

2. A surgical hollow probe according to claim 1 characterised in that the cutting element (10) can be extended or pivoted out of the hollow body (2) in a plane which extends transversely with respect to the longitudinal axis (3) of the hollow body (2) and is displaceable in parallel relationship with the longitudinal axis (3) of the hollow body.

3. A surgical hollow probe according to claim 1 or claim 2 characterised in that the distal opening (20) extends in the longitudinal direction of the hollow body (2) along the path of displacement travel of the cutting element (10).

4. A surgical hollow probe according to one of claims 1 to 3 characterised in that the cutting element (10) is in the form of a wire loop whose both ends (12) are secured to a common or to two separate guide elements (14) which are guided slidably at the outside surface of the hollow body (2) in longitudinal grooves (16) parallel to the longitudinal axis (3) of

the hollow body (2).

5. A surgical hollow probe according to claim 4 characterised in that the distal opening (20) is provided in the peripheral wall (4) of the hollow body (2) between the longitudinal grooves (16).

6. A surgical hollow probe according to one of claims 1 to 3 characterised in that the cutting element (10) is in the form of a wire ring which is secured to a guide element (14) which is guided displaceably at the outside surface of the hollow body (2) in a longitudinal groove (16) along the hollow body (2).

7. A surgical hollow probe according to one of the preceding claims characterised in that the cutting element comprises a flexible wire.

8. A surgical hollow probe according to one of the preceding claims characterised in that the distal opening (20) of the hollow body (2) is arranged adjacent to the longitudinal groove or grooves (16).

9. A surgical hollow probe according to one of claims 1 to 3 characterised in that the cutting element (10) has a plurality of wire segments which are displaced relative to each other in the longitudinal direction of the hollow body (2) and which are guided slidably in longitudinal grooves (16) along the hollow body (2) and whose projection on to a plane perpendicularly to the longitudinal axis (3) together with the wall (2) of the hollow body (2) forms a closed curve, and the ends of which are each secured to a respective guide element (14) which are mounted slidably at the outside surface of the hollow body (2) in longitudinal grooves (16) along the hollow body (2).

10. A surgical hollow probe according to one of the preceding claims characterised in that the guide elements (14) are in the form of thrust rods

which extend from the distal end to the proximal end of the hollow body (2) and which is/are supported slidably and rotatably in the longitudinal grooves (16).

11. A surgical hollow probe according to one of the preceding claims characterised in that at the distal end and/or at the proximal end of the displacement travel which extends parallel to the longitudinal axis (3) the cutting element (10) can be extended from and/or retracted into the hollow body (2).

12. A surgical hollow probe according to one of the preceding claims characterised in that provided at the distal end and/or at the proximal end of the displacement travel in the peripheral wall (4) of the hollow body (2) in the peripheral direction is a gap (18) through which the cutting element (10) can be extended from and retracted into the hollow body (2).

13. A surgical hollow probe according to one of the preceding claims characterised in that the distal opening (20) is closable by means of a closure (22).

14. A surgical hollow probe according to claim 13 characterised in that the closure (22) is mounted displaceably in the radial and/or in the axial direction along the peripheral wall of the hollow body (2).

15. A surgical hollow probe according to one of the preceding claims characterised by a suction removal device which can be connected to the proximal end of the hollow probe (1) for sucking the cut-out tissue into the distal opening (20) and for sucking the tissue away through the hollow passage (8) of the hollow body (2) to the proximal opening of the hollow probe (2).

16. A surgical hollow probe according to claim 13 characterised in

that the hollow body (2) includes a separate suction air passage (40) which extends from the proximal connection of the suction removal device in the longitudinal direction to the distal opening (20) and which is in suction communication over its entire length with the hollow passage of the hollow body (2) by way of suction openings.

17. A surgical hollow probe according to one of the preceding claims characterised in that the distal end (4) of the hollow probe (2) converges to a point.

18. A surgical hollow probe according to one of the preceding claims characterised in that an electrode (30) is arranged on the surface of the hollow body (2) in the region of the distal end (4) and that an HF-voltage source can be connected with one terminal to the electrode (30) and with the other terminal to the cutting element (10), in order locally to limit the HF-current through the tissue.

19. A surgical hollow probe according to one of the preceding claims characterised in that arranged on the surface of the hollow body (2) in the region of the distal end are a first electrode (30) and at an axial spacing a second electrode (32), to which HF-voltage can be applied in order to heat the adjoining tissue upon insertion of the probe.

20. A surgical hollow probe according to claim 19 characterised in that the first electrode (30) and the second electrode (32) are of a cylindrical shape around the longitudinal axis (3).

21. A surgical hollow probe according to claim 19 or claim 20 characterised in that the first and/or the second electrode (30, 32) are axially displaceable.

22. A surgical hollow probe according to claim 19, claim 20 or claim

21 characterised in that the second electrode (32) is arranged on a sleeve which is axially displaceable on the hollow body (2).

23. A surgical hollow probe according to one of claims 19 to 22 characterised in that the one and/or the second electrode serves as a counterpart electrode for the cutting element (10).

24. A surgical hollow probe according to one of the preceding claims characterised by a mechanical device for transferring the cut-out tissue into the distal opening (20) and for transporting the tissue through the hollow body (2) to the proximal opening of the hollow probe.

25. A surgical hollow probe according to one of the preceding claims characterised in that a plurality of cutting elements (10) can be extended from the hollow body (2) transversely with respect to the longitudinal axis (3) and are displaceable outside the hollow body (2) along the hollow body (2).

26. A surgical hollow probe according to claim 25 characterised in that provided for each cutting element (10) is a distal opening (20) which extends along the path of displacement travel of the associated cutting element (10).